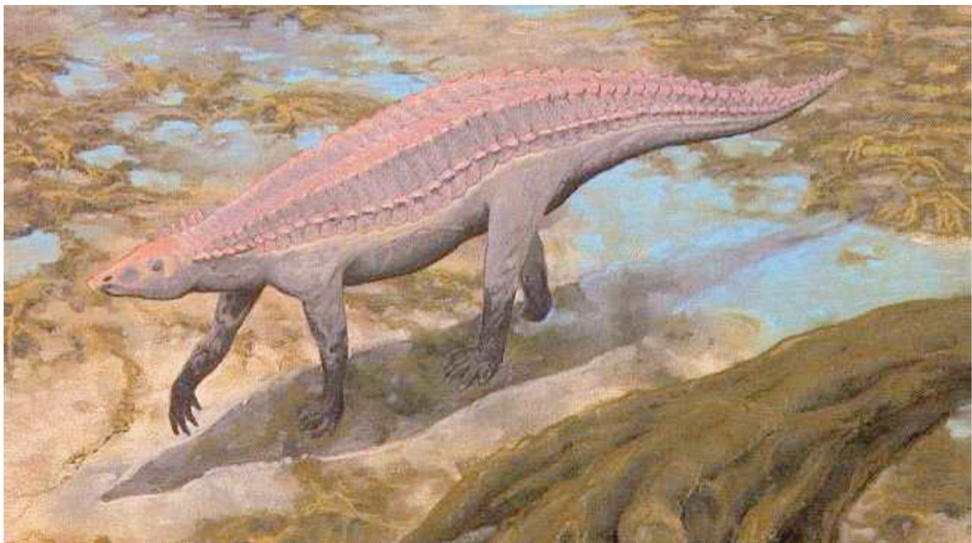


Paleontology at Petrified Forest National Park



Aetosaur *Stagonolepis welllesi*

Ancient Denizens of Petrified Forest

Animals, large and small, left behind clues to their existence in the form of body fossils and trace fossils. Fossil clams and snails can be found scattered through the park’s geological layers. Tracks in the Tepees area of the park are believed to have been made by horseshoe crabs. Still more delicate remains have been found in the thin slabs of shale, such as shrimp, crayfish, and insects—even the wing of a cockroach! The freshwater streams and rivers of the Triassic landscape teemed with fish, especially sharks (such as *Lonchidion* and “*Xenacanthus*”) and lungfish.

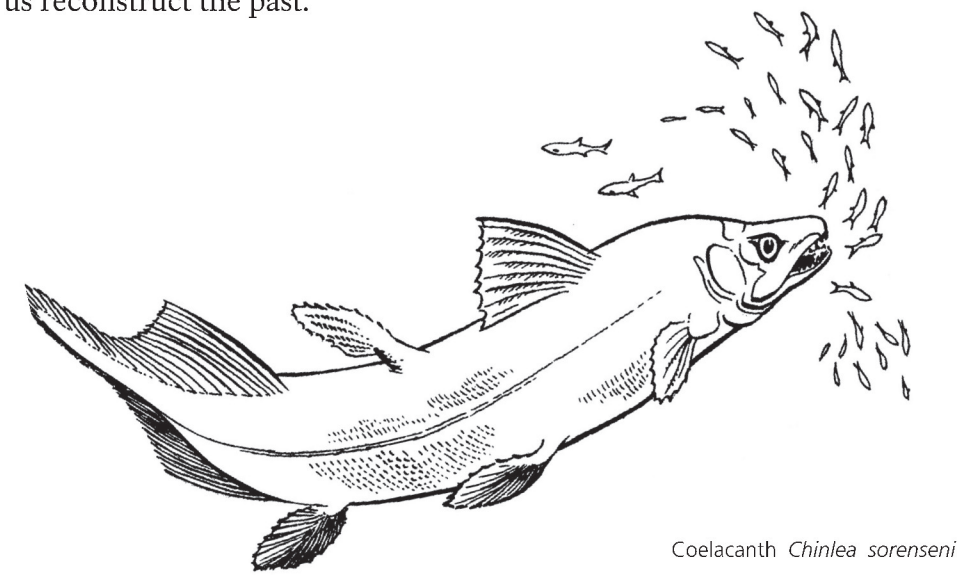
Fish were probably one of the favorite foods of *Koskinonodon* (formally known as *Buettneria*), one of most common animals discovered in the older strata of the park. With their flat heads and upward-directed eyes, these giant amphibians may have settled in the muddy bottom of ponds, like giant salamanders, and ambushed prey from below. In the younger layers of the park, *Koskinonodon* is replaced by a smaller yet similar animal named *Apachesaurus*.

Archosaurs, a specialized group that includes modern birds and crocodiles, were represented in the Triassic by aetosaurs, phytosaurs, and rauisuchians (collectively known as pseudosuchians) and dinosaurs. Similar in appearance and distantly related to crocodiles, phytosaurs (Parasuchians) probably filled similar ecological niches. Phytosaurs are the most common fossil animal found in the park. Aetosaurs (Stagonolepidids) were large omnivorous archosaurs characterized by a bony carapace of rectangular armor plates. The armor was most likely for defense against predators such as rauisuchians and phytosaurs. Rauisuchians bear a resemblance to meat-eating dinosaurs, although they were actually crocodilians. These carnivores were probably the top terrestrial predators.

Most visitors to the park are surprised to learn that dinosaurs, relatively rare and minor components of the Triassic fauna preserved at the park. Separated from other archosaurs by characters of the pelvis and ankle, Late Triassic dinosaurs were mainly small, bipedal carnivorous predators including *Coelophysis* and the primitive *Chindesaurus*. To date, no remains of ornithischian (herbivorous) dinosaurs have been found in the park.

Another group living in the Triassic, the therapsids were large reptiles that possessed many mammalian characters including a “cheek” bone, enlarged canine teeth, specialized pelvis, and the attachment of the skull to the spine. *Placerias* is a large dicynodont therapsid known from isolated elements in the park but common elsewhere in Arizona, especially near St. Johns, southeast of the park, where large numbers of *Placerias* were found in a single quarry.

Fossils animals of the Triassic are as diverse and fascinating as the park’s living fauna. Paleontologists continue to make new discoveries that help us reconstruct the past.



Coelacanth *Chinlea sorenseni*

Recent Paleontological Research

Since the summer of 2001 Petrified Forest has seen significant strides in paleontological research, including relocated and documenting all known paleontological sites in the park. In the last 80 years, over 200 fossil sites have been documented, more than half of which have been relocated and documented recently, and over 50 new sites have been discovered.

From 2001 to 2003, substantial finds in the park included a partial skeleton of aetosaur *Stagonolepis welllesi*, armor plates from a new species of aetosaur, a partial skeleton of the crocodylomorph *Parrishia*, a complete phytosaur skull probably belonging to the species *Leptosuchus crosbiensis*, armor plates from aetosaur “*Desmotosuchus*” *chamaensis*, the first recorded jaw material of *Trilophosaurus* from the park (probably a new species), and a partial skeleton of the rare fossil reptile *Vancleavea*.



Protecting fossils at the dig

The 2004 and 2005 seasons provided the best new fossil material to date. Excavations at the *Revueltosaurus* Quarry revealed at least a dozen skeletons of the *Revueltosaurus callenderi*. This is an important find. *Revueltosaurus* was previously only known from the teeth and was



Transporting fossils from the dig

believed to represent an early ornithischian dinosaur. The fact that this animal is more closely related to crocodiles instead has important implications for the global fossil record of early dinosaurs. A paper on these findings was published in the *Proceedings of the Royal Society Series B* in May of 2005.

The Giving Site has proven to be one of the most productive sites in the park and possibly any other Late Triassic site in the Southwest, providing remains of rauisuchians, aetosaurs, phytosaurs, lungfish, and dinosaurs. Dinosaur finds are extremely rare from the Triassic and the Giving Site has provided a plethora of material. What appears to be a new species of aetosaur was excavated from the Milkshake Quarry. More material from metoposaurs, aetosaurs, and phytosaurs was collected from various sites throughout the park.

In 2006 the *Revueltosaurus* Quarry provided a nearly skeleton of *Revueltosaurus*, greatly enhancing our knowledge of this animal. The Giving Site provided more theropod, rauisuchian, and crocodylomorph material. The park hosted a scientific symposium centering mainly on Late Triassic paleontology. This symposium was accompanied by the publication of a research volume (*Museum of Northern Arizona Bulletin 62*) on Late Triassic geology and paleontology, describing four new fossil trees, several fossil plants, and two new fossil animals from the park including the new phytosaur collected in 2002 (*Pseudopalatus jablonskiae*) and the new trilophosaurid collected in 2003 (*Trilophosaurus dornorum*).

As inventory work and exploration continues over the next few years, new discoveries will shed even more light on the unique period of time in the Earth’s history known as the Late Triassic.



Paleontologist Matt Brown in the park’s prep lab
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